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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,634	12/26/2001	Takashi Arakane	OHTN: 012	8275

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EXAMINER

GARRETT, DAWN L

ART UNIT

PAPER NUMBER

1774

9

DATE MAILED: 07/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/025,634

Applicant(s)

ARAKANE ET AL.

Examiner

Dawn Garrett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 7-10 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 11 and 13-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. This Office action is in response to applicant's election of species 1a (compound 1) and 2b (compound 5) with traverse in paper no. 8 (received April 18, 2003). The traversal is on the ground(s) that "All species 1a-b and 2a-d are sufficiently related." This is not found persuasive, because the species are deemed to be distinct types of compounds that are not closely related. For instance, compound (1) involves the class of aromatic diamines while compound (2) involves the class of aromatic amines with three nitrogens. With regard to the electron transport compounds, compound (3) is requires a nitrogen atom, compound (5) does not require a nitrogen and has two anthracene groups, compound (6) does not require a nitrogen atom and comprises an anthracene skeleton and none of compounds (3, (5), and (6) comprise silicon as required by a cyclic derivative of silicon. The searches for the species are not considered to be overlapping. If applicant believes the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention. Applicant stated claim 8 reads upon the elected species, but claim 8 reads upon the non-elected species of compound (3). Claims 1-6, 11, and 13-18 read on the elected species and are currently under consideration. Claims 7-10 and 12 are withdrawn as non-elected.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-6, 11, and 15-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Hosokawa et al. (US 6,534,199).

The applied reference has a common assignee and two common inventors with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Hosokawa et al. discloses an organic electroluminescent device comprising an organic light emitting medium between electrodes comprising a mixture of (A) a styryl derivative hole transporting compound and (B) an anthracene derivative (see abstract and col. 25, lines 1-14). The ratio of components (A) and (B) is 1:99 to 99:1 (see col. 25, lines 5-6). Component (A), the hole transporting component, comprises a compound according to formula (III), which reads upon instant formula (1) when "g" is 2

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(see col. 3, lines 35-51). Hosokawa formula (III) comprises aromatic groups Ar₃, Ar₄, and Ar₅, which are substituted or unsubstituted aromatic groups with 6 to 40 carbon atoms. Disclosed formula EM34 comprises four condensed rings between the two nitrogen groups per the instant group having "a condensed cyclic group having 3 or more rings" (see col. 15, last formula). Component (B) of the mixed emitting medium is comprised of an anthracene derivative according to Hosokawa formula (I) (see col. 5, lines 7-21), which reads upon instant compound (5) in claim 11. The energy gap, ionization potential, and electron affinity relationships between the hole transporting material and the electron transporting material set forth in instant claims 1, 2, 3, 4, and 18 are deemed to be inherently met by the disclosed Hosokawa compounds (A) and (B) as discussed above (Hosokawa formulas (I) and (III)), because these properties are inherent to an individual compound and the Hosokawa disclosed preferred compounds are the same as the elected species, instant formulas (1) and (5). Hosokawa further discloses it is preferred a layer of a chalcogenide is disposed on the anode and a layer of metal halide or metal oxide is disposed on the cathode per instant claim 15 (see col. 27, lines 2-13). Hosokawa also further discloses it is preferred to include a mixed region of electron transmitting compound and a reducing dopant or a mixed region of a hole transmitting compound and an oxidizing dopant on the surface of at least one electrode per instant claim 16 (see col. 27, lines 22-27). Hosokawa et al. discloses anode materials Au, CuI, ITO, SnO₂, ZnO and In-Zn-O, which are exactly the same as those disclosed by applicant (see instant disclosure, page 33, last paragraph). Accordingly, the relationship between the anode and the hole transporting component

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set forth in instant claim 17 is deemed to be inherently met by the disclosure of Hosokawa et al., which sets forth the elected hole transporting species per instant formula (1) and exactly the same anode materials as the instant application. Hosokawa et al. is deemed to disclose all components of an electroluminescent device as required by instant claims 1-6, 11, and 15-18.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6, 11, 13, 14, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Enokida et al. (US 6,251,531) in view of Inoue et al. (US 5,635,308). Enokida et al. teaches an organic electroluminescence device comprising a light-emitting material (1), which reads upon instant hole transporting material compound (1) per instant claim 6 (see abstract). Enokida further teaches the light emitting layer comprising compound (1) may further comprise a known light emitting material, a known dopant, a known hole-injecting material and a known electron-injecting material (see col. 25, lines 21-25). More specifically, the Enokida compound (1) is taught to be used in combination with another light-emitting material such as anthracene (see col. 25, lines 50-53). Although Enokida teaches the use of compound (1) in a mixed layer with another light emitting or electron injecting-transporting compound, Enokida fails to teach a specific anthracene derivative according to instant electron transporting formula (5)

per claim 11. Inoue et al. teaches in analogous art, a phenylanthracene derivative for an organic EL element (see abstract). Inoue formula (1) reads upon instant formula (5) (see col. 2, lines 21-25 and formula (3), col. 3). Inoue teaches a preferred embodiment includes the phenylanthracene derivative in combination with a hole transporting material in a mixed light emitting layer (see col. 3, lines 42-47). It would have been obvious to one of ordinary skill in the art to have selected the phenylanthracene derivative taught by Inoue in the Enokida mixed light emitting layer and have expected an efficiently operating EL device, because Enokida teaches any known light emitting material, including anthracene, can be used in the mixed light emitting layer and Inoue shows phenylanthracene derivatives are well performing light emitting compounds in a mixed light emitting layer comprising hole transporting material in the mixed layer. Enokida teaches compound (3) (per the hole transporting material) is combined with an electron transporting material in a ratio of 5:3 (see example 1, col. 45, lines 43-46) per the instant ratio of hole transporting compound to electron transporting compound of 8:92 to 92:8 in instant claim 1. Enokida further teaches a fluorescent dopant such as fluorescent dyes may be added to the layer with compound (1) in the amount of 0.0001 to 50% by weight per instant claims 13 and 14. Enokida teaches the anode is gold or ITO, which are the same as anodes disclosed by applicant (see instant disclosure page 33). The energy gap, ionization potential, and electron affinity relationships between the hole transporting material and the electron transporting material set forth in instant claims 1, 2, 3, 4, and 18 as well as the anode to hole transporting material relationship of claim 17 are deemed to be inherently met, because the same compounds, instant

compounds (1) and (5) and anode material, in the instant EL device are the same as disclosed by Enokida and Inoue.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Enokida et al. (US 6,251,531) in view of Inoue et al. (US 5,635,308) in further view of Hung et al. (US 5,776,623). Enokida and Inoue are relied upon as set forth above. Enokida and Inoue fail to teach a layer adjacent an electrode comprised of a chalcogenide, a metal halide, or a metal oxide as recited in instant claim 15. Hung et al. teaches in analogous art a cathode for an electroluminescent device comprising a layer of the metal halide LiF between an organic emitting layer and an aluminum cathode (see col. 4, lines 61-67). Hung et al. teaches adding the layer of LiF results in improved device performance over a single layer cathode. It would have been obvious to one of ordinary skill in the art to have selected a bi-layer cathode including a metal halide layer in manufacturing an electroluminescent device, because a bi-layer cathode is shown in the art to increase device performance.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (703) 305-0788. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached at (703) 308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2351.


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D.G.
June 30, 2003